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VOLUME IIIA

SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY)

DATA ANALYSIS (U)

FINAL REPORT OF BEARING STAKE TESTS

JANUARY THRU MARCH 1976

9 JANUARY 1979



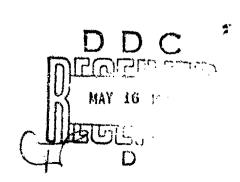
NAVAL AIR DEVELOPMENT CENTER WARMINSTER, PENNSYLVANIA

UNDER CONTRACTS
N62269-77-C-0139
and
N62269-78-M-6884



PREPARED BY

SANDERS ASSOCIATES, INC.
OCEAN SYSTEMS DIVISION
95 CANAL STREET
NASHUA, NEW HAMPSHIRE 03061



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VOLUME IIIA

SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY)
DATA ANALYSIS.



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FINAL REPORT OF BEARING STAKE TESTS
JANUARY THRU MARCH 1976

Volume IIIA. Data Points 1, 2 and 3 Raw Data

9 JANUARY 1979

Proprietary Info.; / Feb. 79. Other resuchts for this document must be referred to NAVAL AIR DEVELOPMENT CENTER

WARMINSTER, PENNSYLVANIA /8974

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Classification Reviewed & Approved By

R. L. Townsend

10 Jan 1979 Date CLASSIFIED BY DD254 1 Dec 76 N62269-77-C-0139 Exempt from GDS of EO 11652 Exemption Category 3 Declassify on 31 Dec 1989

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VOLUME	
IA	Summary - Test Results
ΙΒ	Detailed Description, Test Results
I):	Data Analysis Facility and Data Reduction Methodology
TILA	Data Points 1, 2 and 3 Raw Data
IlrB	Data Points 4, 5 and 6 Raw Data
LVF.	Data Points 7, 8 and 9 Raw Data
IVB	Data Points 10, 11 and 12 Raw Data

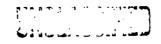
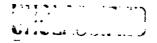


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NOTE ALI Plot Scales for Beamformed and

Omni Data are NOT the same.

SMR comparisons cannot be taken directly

from plot comparisons.

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OMNI NOISE LEVELS

2

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DATA POINT 1	Hz Hz	DATA POINT 2	НZ
DATA	dBrepPa/1 dBrepPa/1	DATA	dBrepPa/1 Hz
	+64.6		+64.7
19 JANUARY 1977	290 Hz 295 Hz	19 JANUARY 1977	290 Hz

dBrepPa/1 Hz

+65.4

295 Hz

POINT	N N	POINT	Hz Hz
DATA	dBreuPa/1 dBreuPa/1	DATA	dBrepPa/1 dBrepPa/1
	+74.5		+13.3
1977		1977	
PEBRUARY	140 Hz 290 Hz	FEBRUARY	zH 057
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5		
POINT	НZ	Hz
DATA	dBreµPa/1	dBreuPa/1
1977 .	+76.6	468.4
FEBRUARY 1	140 Hz	200 113

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DATA	dBrepPa/1 dBrepPa/1	DATA dBreupa/1	dBreµPa/1	DATA	dBrepPa/1	dBreµPa/1	DATA	dBreµPa/1	dBreµPa/1	DATA	dBrepPa/1	dBreµPa/1	DATA	dBreµPa/1	dBreµPa/1
	+76.0	+70.1	+62.2		+67.3	+61.6		+68.2	+65.2		+74.2	+64.6		+70.2	+62.2
7 FEBRUARY 19;	140 Hz 290 Hz	3 FEBRUARY 1977 143 Hz	290 Hz	MARCH 1977		290 Hz	MARCH 1977	140 Hz	290 Hz	MARCH 1977	140 Hz	290 Hz	MARCH 1977	140 Hz	290 Hz
		ထ		15			÷4 5			16			. 16		

• OMNI NOISE LEVELS

16 MARCH 1977

DATA POINT 12

dBrepPa/1 Hz

+72.0 +65.5

140 Hz 290 Hz

dBrepPa/l Hz

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5	OPERATIONAL		PANTE, 2-677 PANTE, 200 M. DEPTH: 1900-11	BATE: 3-16-77 RADGE: 2.2.6.46 PEFTR: 3400-64	DATE: 1-677 RANGE: 72P-M DENTE: 2820M	2476: 34177 TEGGOTTA RANGE: 128PA 1404Z EPTH: 2804FF 25P.E.	DATE 3-16-77 Inc. 6: 0935 B RANGE: 122 MM. 190 P.E. DEFTH: 2800 GM. 280 P.E.	DATE 2-46-72 THE FIRST
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DATA POINT

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<u>e</u>

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE

PREQUENCY

INDICATED NOISE LEVEL dBV 132

dB/µB SYSTEM SENSITIVITY BANDWIDTH CONVERSION TO 1 HZ BAND

CONVERSION TO dBreuPa/1HZ

4100

SECTION 2

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7:17

+100

BANDWIDTH CONVERSION TO 1 HZ BAND

dB/µB

SYSTEM SENSITIVITY

CONVERSION TO dBrepPa/1HZ

<u>e</u> NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE TIME /55/ 2

DATE 1-19.77

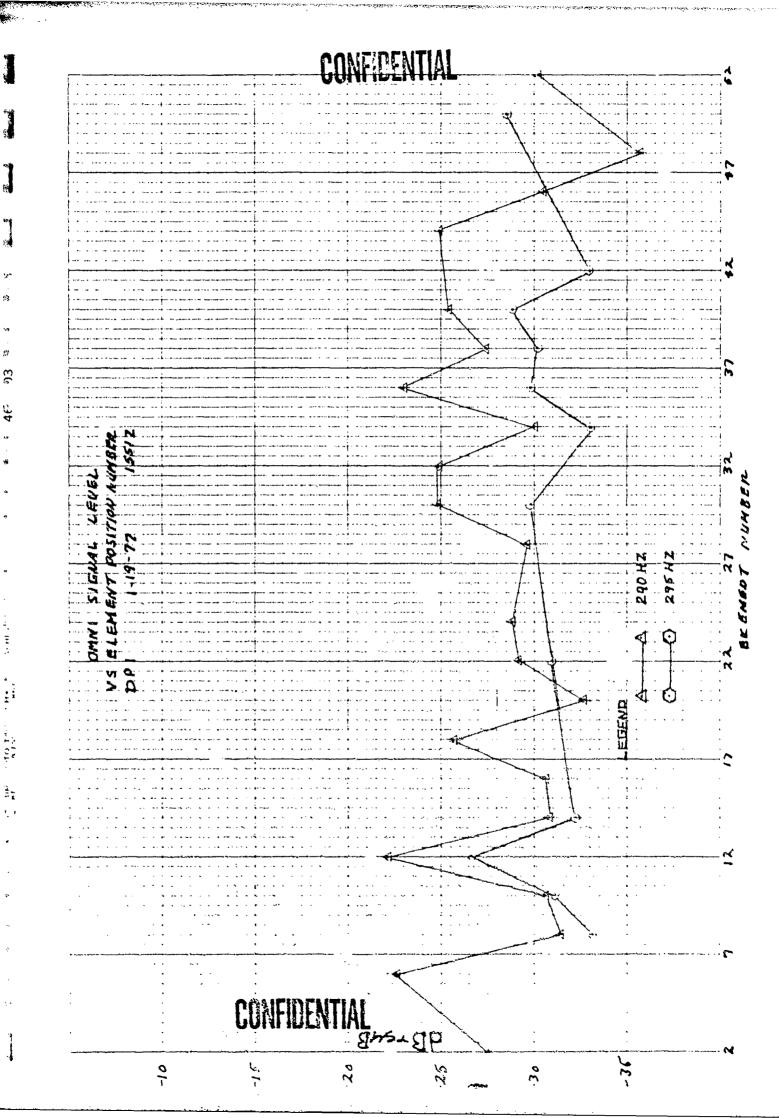
DATA POINT

295

FREQUENCY

INDICATED NOISE LEVEL dBV //32 ABW

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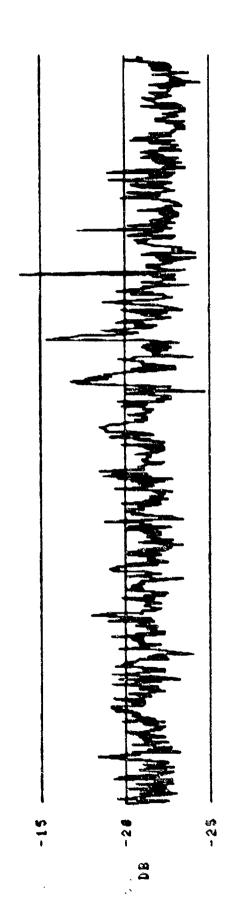
DATE OF AMALYSIS:23JUL77 REEL: 00 SIDE: 6 IMDEX:6466 CONTROLO: 1/18-1651(52) I

SA STORMANDERS AN

ENERGISCIBEARING STAKE DATE/TIME:19 JAN77-15512 PROJECTOR RAMGE: 91.5 NM CENTER FREG:270 HZ ANALYSIS B/W; 1/32HZ JMTEG TIME:320 SECS B/F; 0 DB 541:27 DB 1 ELEMENT NORMAL WEIGHTING

DPI

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【表现的 \$P\$\$ 在这种 \$P\$ 是我们的 \$P\$ 是我们的 \$P\$ 是我们的 \$P\$ 是我们的 \$P\$ 的 \$P\$ 的 \$P\$ \$P\$ \$P\$ \$P\$ \$P\$ 1分分的利用的特殊和的资本。12的10的现在分词大型的资源。10多位多数资本的现在分词的发展的 上的公司的自身的原理,并是否是对对对对人的政治,但是不是不是不是的政治的,但是是不是不是 事实,这些人是一个人的人,是是是一个人的人,是一个人的人的人,他们也不是一个人的人的人的人的人。 第二十二章 自有意义多类的特殊的数据的 克莱斯氏 经发现的 网络埃拉亚亚人 经经济的 医自动感觉 管放线 上於於於人物學的語言的語言的語言學的學術的 经正式公司 经证券 医抗病 排資的 经营证法 数分类或数据编码数据分别字的设置数据的分别数据的变形数据的表现实现实现的表现实现实现的 建的复数形式 医乳腺性 医多种性 医皮肤 医皮肤 医多种性 医多种性 医多种性 医二种性 上层层上层的构体的内容的设计和自由的企业设计的设计。由设计设计和设计设计的 上心感情的反驳的情况是自己的多类类似的现在分词的形式的对象的多类形式 上海 经股份 医多种氏 有數 油酸 经保险股份 经存储 医生物 经实际的 经外外的 上於某一個清華。如此於於自由由於,學學也包含學是,然而因為,以此,以此不是以之 上海,我们是我们是各种的复数形式的最后对象。 网络人名英格兰人姓氏 医皮肤 医皮肤 医多种性性病 医多种性

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自体的 医多种病 使用某些数别的现在分词 经收款 医自体管外部 医原 丰本文集建设在超过的,如其本土经验,为中国经历发展,这个人们会经历,但这是经历发展,但是国 1岁。其他的情况与原则是经验的特殊的人,但是他们是这个是经验的人们的人。 上的主义和自己和自然,这个还在关系,这些对象的人的人的人的人的人的人的人的人的人的人的人。 丰富,好好的情况时间,是我才好好多个时况的,可能因为最后的对象。 化二十二烷烷 生的。如此主义的数据,**以为法律的**类似的的数据的。这一点的现在分类是有的的数据,从外面 上型。1914年,1924年,1月15日,1月15日,1月15日,1月16日,1月16日,1月16日,1月16日,1月16日,1月16日,1月16日,1月16日,1月16日,1月16日,1月16日,1月16日,1月16日, 事的行行。有 40、 10 Am 15亿金钱,18.6%的,18.4%的 18.4%的

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ANALYSIS BAND WIDTH 1/32 bZ WATER DEPTH /650

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EXERCISE: BEARING STAKE

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MRING STALE

CALCULATIONS

DATA POINT | FREQUENCY 290 HZ NUMBER OF ELEMENTS /6

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -60.4

MCPS-32 CAL. CORRECTION +10 -50.4

BEAMFORMER GAIN

+18 -324 SIG. LEVEL FOR SNR CALCULATIO

MRA CORRECTION

+ .7 -31.7 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -78./

MCPS-32 CAL. CORRECTION +10 -68.6

BEAMFORMER GAIN +18 -50.1 NOISE LEVEL FOR SNR CALCULA-

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

-32.4

NOISE LEVEL FOR SNR

PROCESSOR CORRECTION

MRA CORRECTION

+ .7 /4.3 SNR .03/ HZ BAND

BANDWIDTH CONVERSION

-13.2 1.1 SNR 1 HZ BAND

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT / FREQUENCY 295 HZ NUMBER OF ELEMENTS /4

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -18.8

MCPS-32 CAL. CORRECTION +10 -58.8

BEAMFORMER GAIN +18 -40.8 SIG. LEVEL FOR SNR CALCULATIO:

MRA CORRECTION

+ .9 -39.9 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -77.4

MCPS-32 CAL. CORRECTION +10 -47.4

BEAMFORMER GAIN

+18 -49.4 NOISE LEVEL FOR SNR CALCULA-

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

NOISE LEVEL FOR SNR

PROCESSOR CORRECTION

- 4.5 4.1

MRA CORRECTION

* . 9 5.8 SNR .031 HZ BAND

BANDWIDTH CONVERSION -{3.2 -7.4 SNR 1 HZ BAND

CONFIDENTIAL

CONFIDENTIAL POINT

SIGNAL GAIN

MEAN OMNI SIGNAL LEVEL MRA SIGNAL LEVEL ARRAY SIGNAL GAIN	140 HZ	290HZ -44.7 -31.7 18.0	295HZ -53.3 -39.9 /3.4
20 LDG /6 # of elements		24	24
DIFFERENCE	-	- 6	-16 .6

ARRAY GAIN

MRA SNR		14.3	5. 8
MELLN OMNI SNR		2.2	-2.0
ARRAY GAIN		12.1	7.8
THEORETICAL AZMUTH GAIN (at MRA)	***************************************	10.5	10.3
DIFFERENCE	-	+1.6	- 2.5

CONFIDENTIAL

ATTEN:-/Ø DB WTG: HANNING INDE X CNC INTEGRATION TIME 320 SECS FILTER 286112 ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: DATE/TIME: // 1/1/7> CONTROL: 1/14 - 1551 (16)
BEAMPORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ SECRET

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ATTEN: -/ B DB WTG: HANNING INDE X CUCC INTEGRATION TIME 320 SECS FILTER)3 4 DATE/TIME: //11/17 -/55/ Z ANALYSIS BANDWIDTH: 1/10HZ DEG. AZ STEERING DATE OF ANALYSIS: 10 T CONTROL: 1/19 - 1551 (1/2)
BEAMFORMED SPECTRUM(ELEMENTS 22 * 5 % EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
// ELEMENTS SECRET

ATTEN: - O DB WTG: HANNING SECRET SECRET 16 33

ATTEN:-/ DB INDE X CVCC ANALYSIS BANDWIDTH: 1/10HZ CONTROL: ///9 - 155/ (/6) BEAMPORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 274 HZ

SECRET SECRET

ATTEN:-/ DB WTG: HANNING SECRET INDE XCYC INTEGRATION TIME 320 SECS FILTER REEL: 6 DATE/TIME: 7-79-04-155/ Z ANALYSIS BANDWIDTH:1/10HZ -56 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 1/19 - 1551 (16) BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTE' FREQ: Z70 HZ

= 4

SECRET INDE XGWCC INTEGRATION TIME 320 SECS FILTER REEL: 6 ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: CONTROL: 1/1 - 155/ (76)
BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ SECRE

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ATTEN:-/8 DB

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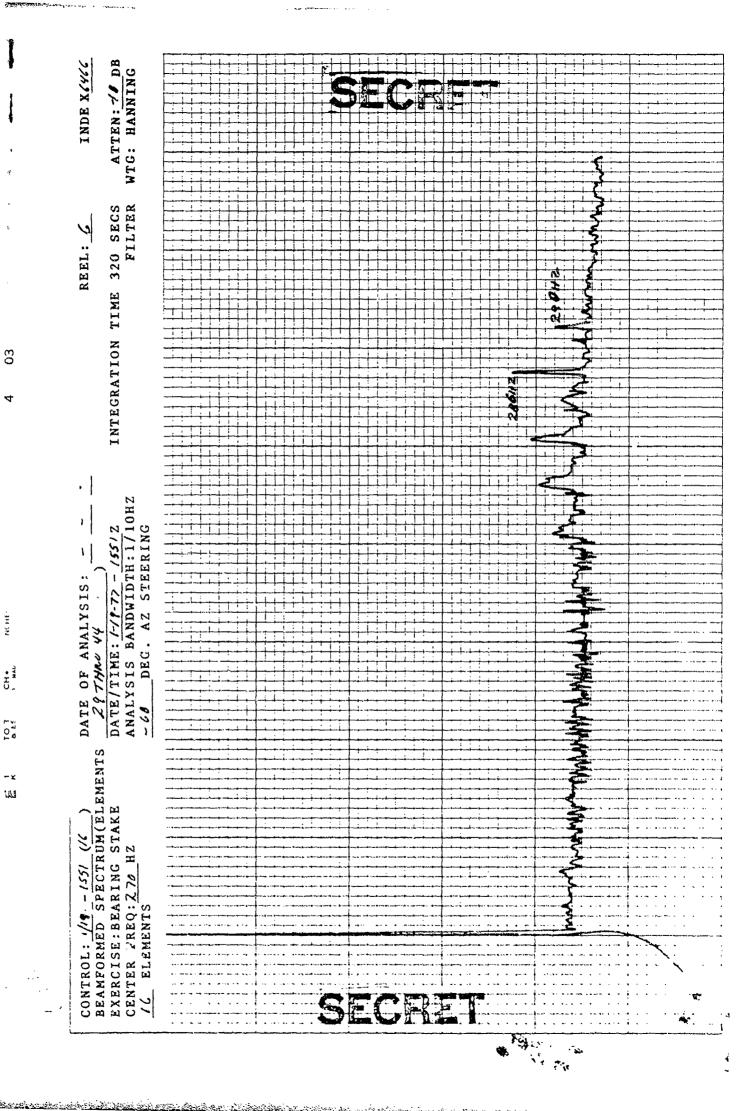
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ATTEN: -/8 DE WTG: HANNING INTEGRATION TIME 320 SECS FILTER 33 4 DATE/TIME: 1-19-77 - 155/ Z
ANALYSIS BANDWIDTH: 1/10HZ
- 60 DEG. AZ STEERING DATE OF ANALYSIS: 4CHE8 CH. 70 T 8 ES: CONTROL: 1/1 ; 155/ (16)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS ¥≃ SECRET

INDE XCECC

INDE XCECC WTG: HANNING INTEGRATION TIME 320 SECS FILTER EXERCISE: BEARING STAKE CENTER PREQ: 270 HZ SECRET 03

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DATE/TIME: 1-14-77 CONTROL: 1/14 - 1551 (16) BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 290 HZ

ATTEN: 70 DB INDE XCML WTG: HANNING INTEGRATION TIME 320 SECS FILTER REEL: 6 ANALYSIS BANDWIDTH: 1/10HZ 21951 -DATE OF ANALYSIS:

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED

MCPS-32 CAL. CORRECTION +10 -47.2

BEAMFORMER GAIN

+/8 -29.2 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION

+ .8 -28.4 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -74.9

MCPS-32 CAL. CORRECTION +io -64.9

BEAMFORMER GAIN

+18 -46.9 NOISE LEVEL FOR SNR CALCULA-

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

-29.2

NOISE LEVEL FOR SNR

-46.9 17.7

PROCESSOR CORRECTION - 4.1 13.6

MRA CORRECTION

+ .8 17.4 SNR .031 HZ BAND

BANDWIDTH CONVERSION

-13.2 1.2 SNR 1 HZ BAND

CONFIDENTIAL

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT / FREQUENCY 295 HZ NUMBER OF ELEMENTS 32

* SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -65.0

MCPS-32 CAL. CORRECTION +10 -55.0

BEAMFORMER GAIN

418 -37.0 SIG. LEVEL FOR SNR CALCULATIO:

MRA CORRECTION

+ 18 -36.2 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -74.8

MCPS-32 CAL. CORRECTION +10 -64.8

BEAMFORMER GAIN

+18 -46.8 NOISE LEVEL FOR SNR CALCULA-TION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

- 37.0

NOISE LEVEL FOR SNR

PROCESSOR CORRECTION

~4.3 \$.5

MRA CORRECTION

4 .8 6.3 SNR .03/ HZ BAND

BANDWIDTH CONVERSION

-17.2 -6.9 SNR 1 HZ BAND

CONFIDENTIAL

BATA POINT 1

SIGNAL GAIN

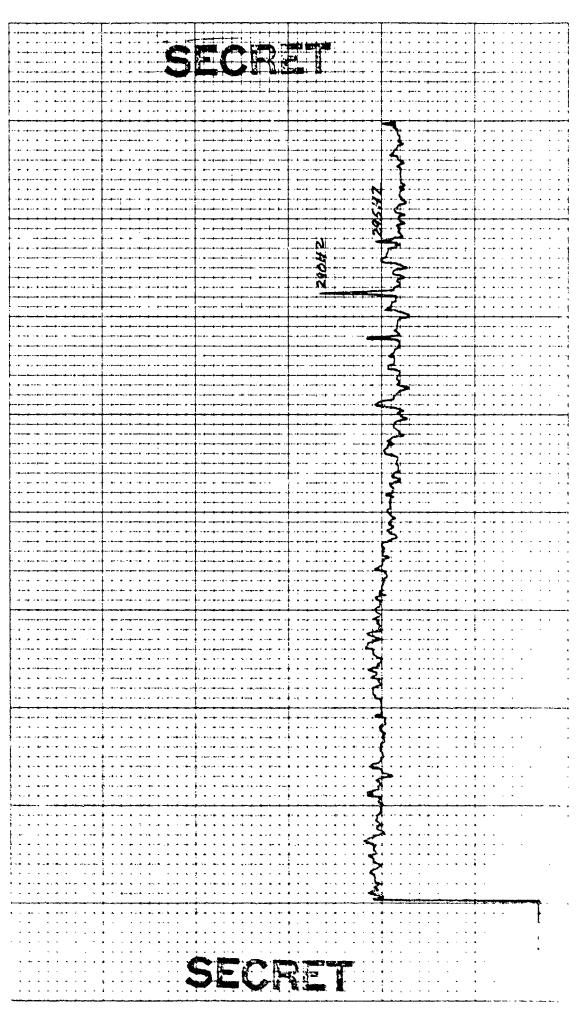
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MEAN OMNI SIGNAL LEVEL		-49.7	- 53.3
MRA SIGNAL LEVEL ARRAY SIGNAL GAIN		-28.4 21.3	<u>-36.2</u> 17.1
20 LOG 32	***************************************	30./	30.1
# of elements		-8.8	-13.0

ARRAY GAIN

MRA SNR		14.4	4.3
HEALY OMNI SNR		2.2	- 2.0
ARRAY GAIN		12.2	8. 3
THEORETICAL AZMUTH GAIN (at MRA)		13.3	13.4
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ATTEN: -/ & DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10HZ - 60 DEC. AZ STEERING DATE OF ANALYSIS: 16-26 \$ 29-49 DATE/TIME: /-/9-77 CONTROL: 1-19 - 155/ (32.) BEAMPORMED SPECTRUM(RLEMENTS EXERCISE: BEARING STAKE CENTER FARQ: 270 HZ



ATTEN: -/Ø DB WTG: HANNING INDE XCXCE SECRET INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10HZ BATE/TIME: 1-1877 CONTROL: 1-19 -155/ (\$2)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS SECRET

ATTEN: -/8 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10HZ CONTROL: 1-19 - 1551 (32)
BEAMPORMED SPECTRUM(ELEMENTS CENTER PREQ: 270 HZ SECRET

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INDE X 6466 ATTEN:// DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER REEL: 6 ANALYSIS BANDWIDTH: 1/10HZ DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 1-14 - 1551 (DL)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE 32 ELEMENTS SECRET

ATTEN: -/8 DB WIG: HANNING INDE XCHCC INTEGRATION TIME 320 SECS FILTER DATE/TIME: 1-18-77 - 155/ Z
ANALYSIS BANDWIDTH: 1/10HZ
-C DEG. AZ STEERING CONTROL: 1-19 - 1551 (32) BEAMPORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ SECRET

ATTEN:-/8 DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER ANALYSIS BANDWIDTH: 1/10HZ
-52 DEG A7 CMTT CONTROL: 1/19 - 1/55/ (J2.)
BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE 32 ELEMENTS SECRET

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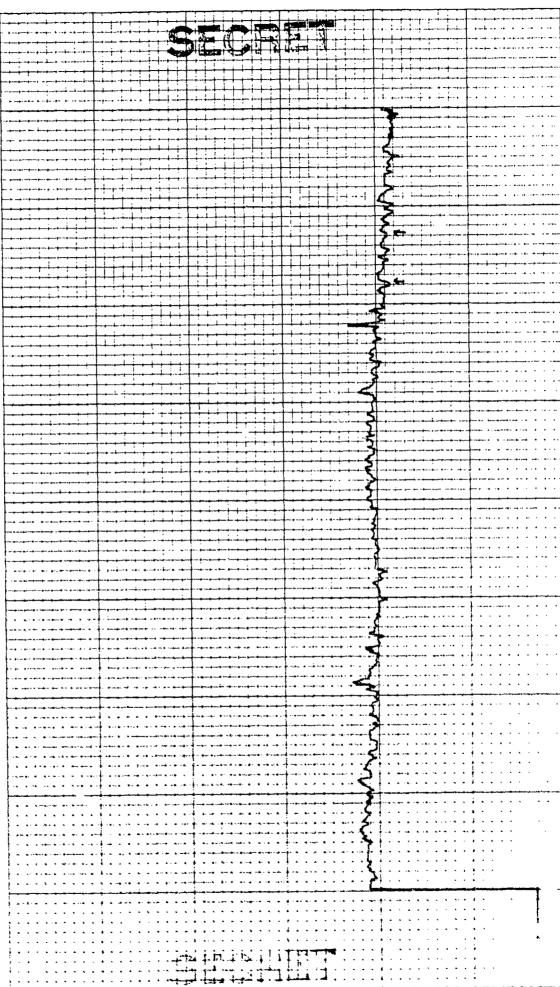
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ATTEN:-/Ø DB WTG: HANNING SECRET INTEGRATION TIME 320 SECS FILTER DATE/TIME: 1-11-17 SECRET

INDE VCYCE	ATTEN:-// DB WIG: HANNING	
REEL:	INTEGRATION TIME 320 SECS FILTER	
DATE OF ANALYSIS:	16-26 4 24-49 DATE/TIME: 1-477 - 46/2 ANALYSIS BANDWIDTH: 1/10HZ -48 DEG. AZ STEERING	
CONTRUL: 1/11 - 1551 (32)	EMENTS	ر در



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ATTEN: -/ DB WTG: HANNING INDE X CYCL INTEGRATION TIME 320 SECS PILTER REEL: 6 /(T-al + 29 T-49)

DATE/TIME: /-/ -77 - 155 / 2

ANALYSIS BANDWIDTH: 1/10HZ

-59 DEG. A7 CTTT CONTROL: 1/14 - 1551 (32)
BEAMPORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE 32 ELEMENTS

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INDE X 6466 ATTEN:-/ DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10HZ -59.5 DEC. AZ STEERING CONTROL: 1/14 - 155/ (32)
BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ SECRET

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT / FREQUENCY 295 HZ NUMBER OF ELEMENTS 52

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -37./

MCPS-32 CAL. CORRECTION +0 -37./

BEAMFORMER GAIN

+0 -37./ SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION

+ .8 -31.3 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -43.7

MCPS-32 CAL. CORRECTION +0 -43.7

BEAMFORMER GAIN

+0 -43.7 NOISE LEVEL FOR SNR CALCULA-

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

-37./

NOISE LEVEL FOR SNR -43.7 6.6

PROCESSOR CORRECTION -4.1 1.1

MRA CORRECTION

+ .8 2.5 SNR .031 12 BAND

BANDWIDTH CONVERSION

-13.2 -10.7 SNR 1 HZ BAND

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT | FREQUENCY 290 HZ NUMBER OF ELEMENTS 52

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -28.4

MCPS-32 CAL. CORRECTION + 0 -28.4

BEAMFORMER GAIN

+ o -28.4 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION

+ ·8 - 27.6 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -43.7

MCPS-32 CAL. CORRECTION + 0 - 43.7

BEAMFORMER GAIN

+0 -43.7 NOISE LEVEL FOR SNR CALCULA-

TION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

-28.4

NOISE LEVEL FOR SNR

-42.7 15.3

PROCESSOR CORRECTION - 4.2 //. 3

MRA CORRECTION

HZ 12./ SNR .03/ HZ BAND

BANDWIDTH CONVERSION

-13.2 -1.1 SNR 1 HZ BAND

DATA POINT

SIGNAL GAIN

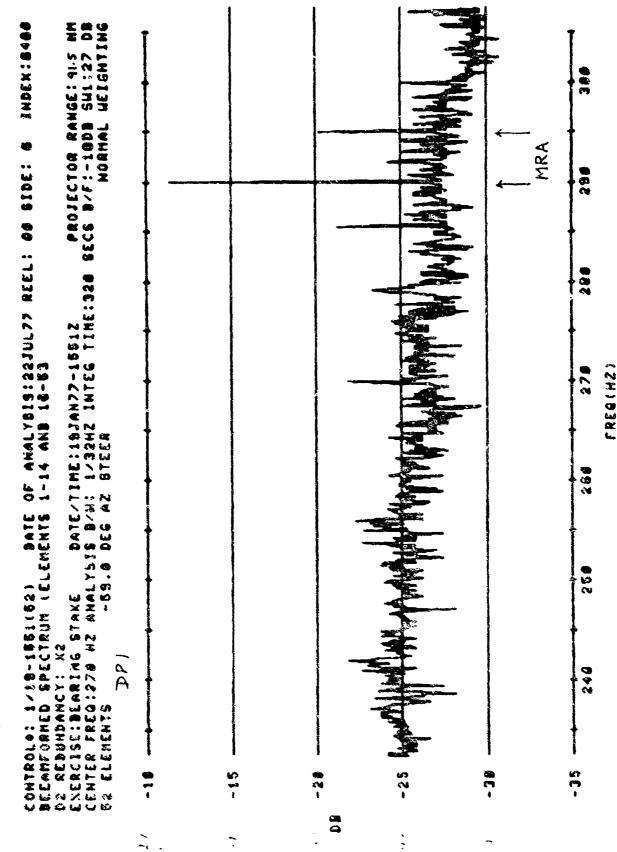
	140 HZ	290HZ	2951IZ
MEAN ONNI SIGNAL LEVEL		~ 49.7	- 53. 3
MRA SIGNAL LEVEL		- 27.6	-31.3
ARRAY SIGNAL GAIN		22.1	17.0
20 L0G <u>52</u>		<u> 34.3</u>	34.3
# of elements			
DIFFERENCE		-12.2	-17.3

ARRAY GAIN

MRA SNR	**********	12.1	2.5
MEAN OMNI SNR		7,2	-2.0
ARRAY GAIN		9.9	4.5
THEORETICAL AZMUTH GAIN (at MRA)		15.4	15.4
DIFFERENCE		-5.5	-11.9

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HOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE

70071

TIME

(a)

1-19-77 DATE DATA POINT

7 H 290 PREQUENCY

INDICATED NOISE LEVEL dBV 1/32 ABW

dB/µB SYSTEM SENSITIVITY BANDWIDTH CONVERSION TO 1 HZ BAND

CONVERSION TO dBreuPa/1HZ

1.47+ 4133 +100 (8-)-

UNCLASSA

UNCLASSIFIED

-55.89 134.6 -47.9 (8-) -+13.3 +100

1 HZ BAND

BANDWIDTH CONVERSION TO

CONVERSION TO dBrepPa/1HZ

gη/gp

SYSTEM SENSITIVITY

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE

(n)

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TIME

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295

FREQUENCY

INDICATED NOISE LEVEL dBV //32

DATE 1-19-77

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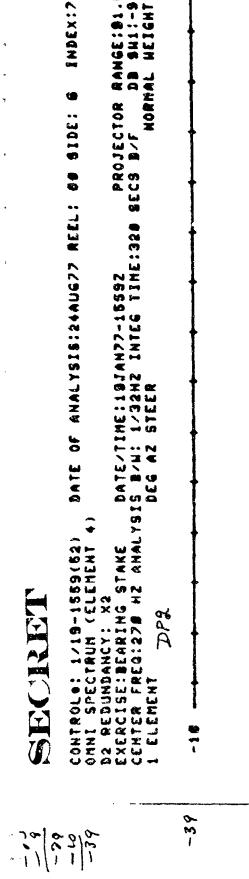
DATA POINT

SECTION 6

UNCLASSIFIED

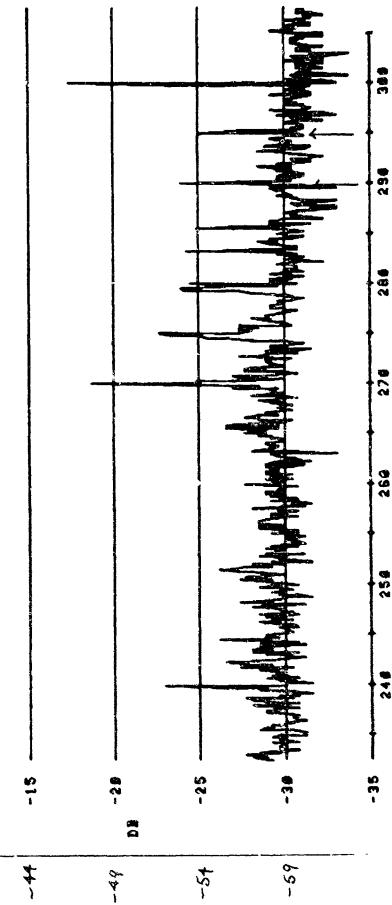
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1 NDEX: 7575

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上等。1960年6月1日,1960年8月1日,1960年8月1日,1960年8月1日,1960年8月1日,1960年8月1日,1960年8月1日,1960年8月1日,1960年8月1日,1960年8月1日,1960年8月

上的。構造的推進的學科學的特別。這個的學科學的學科學的學學的學術的學術就可以

上层的线线或对抗 数数存款 电影的现在分词形式的复数形式的复数形式

1996年至李明斯的自由自由,在美国自己的政治是是一种自己的专品是否。

1重点的旅游的现在分类的特别的特别。但如此是自然经历的中华物质企图的

· 自己基础 "我们的基本的现在分词,但不是一个的现在分词,这个人的意思的。"

才能是自我的智慧的,但是是他的态度的,这是这种"特别的"。这是1956

上数据主题的基础。内容的特别的现在分词是影响的激励。对于多见,社会的多数。

上的数据等可以是的制度过度过多效量与性能。这个能够的各种是实现在也是

十分,然后在京都的有数明教系统多数在这位的大学会会的行为不利的

上於國際監察的國際的自由權利 化多面层比较高级的复数形式的 经经济公司

[1886] 水理的现在分词增加度,或设施的现在分词来自然的企业。

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"我们是我们的,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人, "我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的人,我们就是我们的

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THE REPORT OF THE PROPERTY OF

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是是是自己的人,我们就是这种的人,我们就是这种的人,但是是这种的人,就是这种的人。

"我们的我们们的特别,我不会把我们的这种的**我们就**是

SECRET A CONTRACTOR OF THE PROPERTY O THE REPORT OF THE PARTY OF THE THE RESERVE OF THE PROPERTY OF 1988 - Maria Carlo · 2016年1月1日,1917年1日,1917年1日1日,1918年1日,1918年1日,1918年1日,1918年1日,1918年1日,1918年1日,1918年1日,1918年1日,1918年1日,1918年1日 · 1000年1月1日 1100年1日 1 福尔公司,在文学的证明的基础。这里的一般全体影響的一种 Fig. 1. The control of the second of the sec 。1971年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1982年,1 Commence of the Commence of th The state of the s

上的原理。如此的例如是是自己的数据,但是全国的主要的形式的,这种是由于通过是自己的 事的企业,但可以可以通过的企业,并且包含的企业的企业的企业,但是这种企业,但是自己的企业的企业。 上本文集性的。1916年12月1日 11月1日 11日日 ext #1. #加速性表現 的现在分词的 经分价的 经基础的现在式 经经济的 化化烷烷 经产品的 5. 这样 上數學數學的發展了對於自然的發展,所以的學術的學術學的學術學的學術學的學術學的學術學的學術學的學術學的 上的支持。在各种的工具体的对象的特殊的人的证明,这种是这种的现象。从此中 上於 表 主席 相连语 人用 新的银铁路 法保险 经保险 医阿尔克特 医马克德克氏病 医疗电影 TACLE TO THE TERM TO THE TO THE TOTAL TO TH

CONTROL NUMBER 1 (C) 11-4, D) 2

NUMBER OF ELEMENTS 41

FREQUENCY BAND 1 TO 2 RANGE 11 N.M.

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H I S T O F R A Z TAPE REEL NUMBER 5/06 C

ANALYSIS BAND SIDTH 1/32 HZ WATER DEPTH 1650 FMG ELEMENT NUMBERS / 1/4 Y /C/L -//

物质的复数形式 人名英格兰人姓氏格兰人姓氏格兰人姓氏格兰的变体

DVTE 1-14-77

EXERCISE: BEARING STALE

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MERCISE: BEARING STUDE

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 2 FREQUENCY 290 HZ NUMBER OF ELEMENTS //

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -37./

MCPS-32 CAL. CORRECTION + 0 -37:/

BEAMFORMER GAIN

to -37.1 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION

+ .9 -36.2 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -44.6

MCPS-32 CAL. CORRECTION +0 -44.6

BEAMFORMER GAIN

+0 -466 NOISE LEVEL FOR SNR CALCULA-

ZOIT

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

- 37./

NOISE LEVEL FOR SNR -44.6 7.5

PROCESSOR CORRECTION = 4.7 - 2.8

MRA CORRECTION

7 . 9 3.7 SNR .031 HZ BAND

BANDWIDTH CONVERSION

-(7.2 - 9.5 SNR 1) HZ BAND

GUNTALA

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 2 FREQUENCY 295 HZ NUMBER OF ELEMENTS /C

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -38.7

MCPS-32 CAL. CORRECTION +0 _-38.7

BEAMFORMER GAIN

+0 -38.7 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION

+ .9 -37.8 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -44.6

MCPS-32 CAL. CORRECTION +0 -44.6

BEAMFORMER GAIN

40 -466 NOISE LEVEL FOR SNR CALCULA-

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

-38.7

NOISE LEVEL FOR SNE

-44.6 5.9

PROCESSOR CORRECTION

-5.0 .9

MRA CORRECTION

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BANDWIDTH CONVERSION $\frac{-13.2}{-11.4}$ SNR 1 HZ BAND

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DATA POINT 2

SIGNAL GAIN

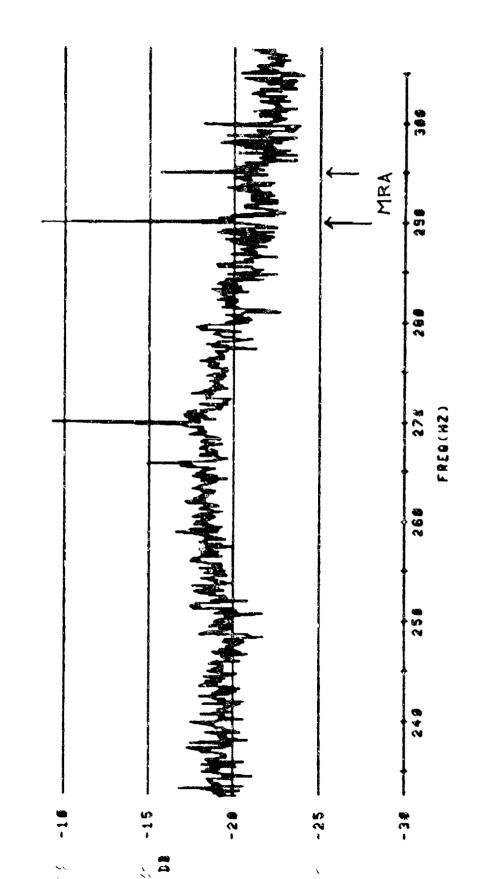
MEAN OMNI SIGNAL LEVEL MRA SIGNAL LEVEL ARRAY SIGNAL GAIN	140 112	290HZ - 51.5 - 36.2 15.3	295HZ -51.2 -37.8 13.4
20 LOG //C # of elements		24	_21
DIFFERENCE		-8.7	-10.6

IRRIY GAIN

MRA SNR	3.7	1.8
MRALY CHNI SNR	2	7
ARELY GAIN	3.9	2.5
THEORETICAL AZMUTH GAIN (at MRA)	 10.4	10.4
DIFFERENCE	 - 6.5	- 7.9

CONFIDENCE

IMDEX:7875 TOR RANGE: 965 AT : -1200 SH1:27 SB HORDAL HEIGHTING ENERGISE: BEARING STAKE DATE/TIME: 18JAN77-18002 PROJECTOR RANGE: 965 CENTER FREG: 278 HZ ANALYSIS B/W: 1/32HZ INTEG TIME: 320 BECS B/F:-1208 SW1:27 16 ELEMENTS S7.0 DEG AZ STEER REEL: 60 519E: 6 COMTROLO: 1/19-166F(15) DATE OF AMALYSIS:20U677 2 REDUNDANCE: X2



PLOT SECURIET

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -55.8

MCPS-32 CAL. CORRECTION ± 10 - 45.8

BEAMFORMER GAIN +/8 -27.8 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION

+ .8 -27.0 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -69.0

MCPS-32 CAL. CORRECTION +10 -59.0

BEAMFORMER GAIN

+18 -41.0 NOISE LEVEL FOR SNR CALCULA-

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

-27.8

NOISE LEVEL FOR SNR

-41.0 13.2

PROCESSOR CORRECTION

- 4.2 9.2

MPA CORRECTION

+ .8 10.0 SNR .03/ HZ BAND

BANDWIDTH CONVERSION

-13.2 - 3.2 SNR 1 HZ BAND

DATA POINT 2 FREQUENCY 295 HZ NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -61.3

MCPS-32 CAL. CORRECTION +16 -51.3

BEAMFORMER GAIN

+18 -33.3 SIG. LEVEL FOR SNR CALCULATIO:

MRA CORRECTION

+ .8 -32.5 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -19.0

MCPS-32 CAL. CORRECTION +10 -59.0

BEAMFORMER GAIN +18 -+1.0 NOISE LEVEL FOR SNR CALCULA-

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

-33.3

NOISE LEVEL FOR SNR -41.0 7.7

PROCESSOR CORRECTION -4.7 3.0

MRA CORRECTION

+ .8 3.8 SNR .031 HZ BAND

BANDWIDTH CONVERSION

-13.2 -9.4 SNR 1 HZ BAND

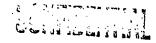
DATA POINT 2

SIGNAL GAIN

	140 [12]	290HZ	295HZ
MEAN OMNI SIGNAL LEVEL	-	-51.5	- 51.2
MRA SIGNAL LEVEL		-27.0	-32.5
ARRAY SIGNAL GAIN		24.5	18.7
20 LOG 32 # of elements		30.1	30.1
DIFFERENCE		-5.6	-11.4

ARRAY GAIN

MRA SNR	****	10.0	3.8
MELLY OMNI SNR		2	7
ARRAY GAIN		12.2	4.5
THEORETICAL AZMUTH GAIN (at MRA)		13.3	13.4
DIFFERENCE		- 1.1	- 8.4



INDE X 7575 ATTEN:-/8 DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER REEL: 6) DATE/TIME: 1-19-77 - 1600 Z ANALYSIS BANDWIDTH: 1/10HZ DEG. AZ STEERING DATE OF ANALYSIS: DATE/TIME: CONTROL: 148 -1606 (32)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS SECRET

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DATE/TIME: 1-/4-77 - 1600 Z
ANALYSIS BANDWIDTH: 1/10HZ
-46 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 1-19 - 1600 (322)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

INTEGRATION TIME 320 SECS FILTER

ATTEN: -/ DB WTG: HANNING

REEL: 6

INDE X7575

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ATTEN: -/ DB WTG: HANNING INDE X7575 INTEGRATION TIME 320 SECS FILTER REEL: 6 DATE/TIME: 1-19-77 - 1600 Z ANALYSIS BANDWIDTH: 1/10HZ DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 1-19 - 1600 (32)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 270 H2
32 ELEMENTS SECRET

ATTEN: -/ DB WTG: HANNING INDE X 3575 INTEGRATION TIME 320 SECS FILTER DATE/TIME: 1-19-79 - 1600 Z ANALYSIS BANDWIDTH: 1/10HZ -52 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 1-19 - 1606 (32)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

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INDE X 7575 ATTEN: -/8 DB WIG: HANNING INTEGRATION TIME 320 SECS PILTER DATE/TIME: 1-19-77 - 1600 Z ANALYSIS BANDWIDTH: 1/10HZ CONTROL: 1-19 - 1600 (JZ)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: ZZO HZ
ZZ ELEMENTS SECRET

INDE X 752 ATTEN: 1/8 DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER 150 CONTROL: j-ff - 1000 (32)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ SENTER FREQ: 270 HZ SECRE

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ATTEN: -/8 DB WTG: HANNING INDE X 7575 INTECRATION TIME 320 SECS FILTER REEL: 6 ANALYSIS BANDWIDTH: 1/10HZ
-58,5 DEC A7 CT. DATE OF AMALYSIS: 16-264 29-4 P
DATE/TIME: 1-19-77 -CONTROL: 1-14 - 1600 (32)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

ATTEN: -/8 DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER BEAMFORMED SPECTRUM(ELEMENTS)
EXERCISE: BEARING STAKE DA CENTER FREQ: 270 HZ

SECRET

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INTEGRATION TIME 320 SECS FILTER REEI - 6 DATE/TIME: /-19-77 -/600 Z ANALYSIS BANDWIDTH: 1/10HZ --24 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 1-14 - 100 (3x)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

ATTEN: -// DB WTG: HANNING

INDE A7575

INDE X7575 ATTEN: 7/ DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER REEL: 6 DATZ/TIME: 1-16-77 - 1606 Z ANALYSIS BANDWIDTH: 1/10HZ -66 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 1-19 - 1600 (32)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

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CONFIDENTIAL

SIGNAL LEVEL AND SNR CALCULATIONS

DATA POINT 2 FREQUENCY 290 HZ NUMBER OF ELEMENTS 50

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED _59.0

MCPS-32 CAL. CORRECTION +10 -49.0

BEAMFORMER GAIN

+24 -25.0 SIG. LEVEL FOR SNR CALCULATIO:

MRA CORRECTION

+ .9 -24.1 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -73.4

MCPS-32 CAL. CORRECTION +10 -63.4

BEAMFORMER GAIN

+24 - 34 · f NOISE LEVEL FOR SHR CALCULA-

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

-25.0

NOISE LEVEL FOR SHR

-39.4 14.4

PROCESSOR CORRECTION

- 4.2 10.2

MRA CORRECTION

4 .9 11.1 SHR -831 HZ BAND

BANDWIDTH CONVERSION

-13.2 -2.1 SNR 1 HZ BAND

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 2 FREQUENCY 295 H2 NUMBER OF ELEMENTS 50

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -66.2

 ± 10 -56.2

BEAMFORMER GAIN

+24 -32.2 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION

+ .8 -31.4 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -73.4

MCPS-32 CAL. CORRECTION +10 -63.4

BEAMFORMER GAIN

+24 -39.4 NOISE LEVEL FOR SNR CALCULA-KOIT

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNA

-32.2

NOISE LEVEL FOR SNR -39.4 7.2

PROCESSOR CORRECTION

_4.8 2.4

MRA CORRECTION

+ 4 72 SNR . HZ BAND

BANDWIDTH CONVERSION

-13.2 -10.0 SNR 1 HZ BAND

CONFIDENTIAL

DATA POINT 2

SIGNAL GAIN

-	140 HZ	290HZ	295117
MEAN ONNI SIGNAL LEVEL		- 51.5	-51.2
MRA SIGNAL LEVEL		-24.1	-31.4
ARRAY SIGNAL GAIN		27.4	19.8
20 LOG 50		37.1	31.9
# of elements			
DIFFERENCE		- 6.5	-14.1

ARRAY GAIN

ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: DATE / TIME: /-/ 1-17 CONTROL: 1-19 - 1600 (50)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
50 ELEMENTS

INTEGRATION TIME 320 SECS FILTER

INDE X 7575 ATTEN: -2 / DB WTG: HANNING

DATE OF ANALYSIS: CONTROL: 1-14 - 1600 (50)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE CENTER PREQ: 274 HZ

INDE X7575

ATTEN:-24DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER

SECRET

364. 6

ANALYSIS BANDWIDTH: 1/10H2 DATE OF ANALYSIS: 1-14 \$ 16-25 \$ 20-53 CONTROL: /-/4 - /606 (50)

BEAMPORMED SPECTRUM(ELEMENTS

EXERCISE: BEARING STAKE

CENTER PREQ: 270 HZ

SO ELEMENTS

INDE X 26 75

ATTEN:-2K DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER SECRET

INDE X7575 ATTEN: -2Y DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: E5-32402-91 & h1-1 CONTROL: 1-19 - 1600 (50) BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER PREQ: 370 HZ. SECRET

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ATTEN: -2 K DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER 1 DATE/TIME:/-/6-77 - /600 Z
ANALYSIS BANDWIDTH:1/10HZ
-56 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: /-/f - / 100 (50)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 270 HZ
50 ELEMENTS

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INDE X 2575

S. C.

ANALYSIS BANDWIDTH: 1/10HZ CONTROL: I-I9 - I 000 (50)BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: $270 \, \mathrm{Hz}$

2 0097-DATE OF ANALYSIS: |-|4\$/6-26\$/28-53 |DATE/TIME:/-/9-77-4

REEL:

INDE XZZZZ

INTEGRATION TIME 320 SECS PILTER

ATTEN:-24 DB WTG: HANNING

INTEGRATION TIME 320 SECS FILTER ١ ANALYSIS BANDWIDTH: 1/10HZ DATE/TIME: /-/9-77 - 1600 Z DATE OF ANALYSIS: 1-144 16-264 28-53 CONTROL: 1-11 - 1605 (50)

BEAMPORMED SPECTRUM(ELEMENTS

EXERCISE: BEARING STAKE

CENTER PREQ: 270 HZ

SO ELEMENTS

REEL: 6

INDE X 2535

ATTEN: 22 DB WIG: HANNING

SECRET

ATTEN: -2Y DB WIG: HANNING INTEGRATION TIME 320 SECS FILTER CONTROL: 1-14 - 1600 (50)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 270 HZ
50 RLEMENTS SECRET

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ANALYSIS BANDWIDTH: 1/10HZ DATE/TIME: /-/f-77 -/600 2 DATE OF ANALYSIS: 1-14\$ 16-26\$ 28-53 CONTROL: 1-11 - 1600 (50)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 270 HZ
50 ELEMENTS

REEL: 6

INDE X 7.57.5

ATTEN:-24 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER

INDE X 7675

03

SECRET ATTEN:-24 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10HZ -66 Dec. Az STEERING CONTROL: H19 - 1600 (50) BEAMPORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ SECRET

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EXERCISE: BEARING STAKE SECRET

ATTEN: 2% DB WTG: HANNING INDE X757 INTECRATION TIME 320 SECS FILTER ANALYSIS BANDWIDTH: 1/10H2-70 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 1-19 - 1600 (50)

EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ 2016-61 SECRET

03

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09342 DATE

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FREQUENCY

INDICATED NOISE LEVEL dBV 1/10

DATA POINT

NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE

INCLASSIFIED

SYSTEM SENSITIVITY

BANDWIDTH CONVERSION TO 1 HZ BAND

CONVERSION TO dBrepPa/1HZ

SECTION 10

UNCLASSIFIED

<u>e</u> NOISE SPECTRAL DENSITY CALCULATIONS FOR SPRAY/BEARING STAKE TIME 04342 DATE **n** DATA POINT

PREQUENCY 140

INDICATED NOISE LEVEL, dBV 1/10
ABW

SYSTEM SENSITIVITY dB/µB

BANDWIDTH CONVERSION TO 1 HZ BAND

CONVERSION TO dBrepPa/1HZ

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UNCLASSIFIED

INDEXSERS SECRET ATTEN: DB WTC: HANNING INTEGRATION TIME 320 SECS FILTER REEL: FIY ANALYSIS BANDWIDTH: 1/10HZ DEG AZ STEERING DATE/TIME: 2-7-77 -0924 2 DATE OF ANALYSIS: CONTROL: 2-7 -0934 (27)
OMNI SPECTRUM(ELEMENT
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ 1 ELEMENT SECRET

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INDEX3575 ATTEN: DB	SECRET
REEL: F14	
INTEGRATION	
DATE OF ANALYSIS: DATE/TIME: 2-7-77 - 0434 2 ANALYSIS BANDWIDTH: 1/10HZ	
CONTROL: 2-7 -0934 (31) DATE OMNI SPECTRUM (ELEMENT 10) EXERCISE: BEARING STAKE CENTER PREQ: 150 HZ ANAL	

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ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2-7-77 -0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING EXERCISE: BEARING STAKE CENTER FREQ: 150 HZ CONTROL: 27 -0434 (32) OMNI SPECTRUM(ELEMENT SECRET

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DATE OF ANALYSIS:

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ATTEN: DB WIG: HANNING INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2-7-77 - 0939/2
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING CONTROL: 2-7 - 0924 (33)
OMNI SPECTRUM (ELEMENT 14)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT SECRET

INDEXSSZS

REEL: F14

DATE OF ANALYSIS:

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SECRET ATTEN: _ DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2-7-77 - 08242
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0434 (34)
OMNI SPECTRUM (ELEMENT /6 EXERCISE: BEARING STAKE CENTER PREQ: 150 HZ SECRET

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INDEX 3575

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CONTROL: 2-7 -0934 (35)
OHNI SPECTRUH (ELEMENT 15
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ
1 ELEMENT

DATE/TIME: 2-7-72 - 0974 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEC AZ STEERING

INDEXZEZZ

ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER SECRET SECRET

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AHALYSIS: E:2-7-77 - 0ff4 2 BANDWIDTH:1/10HZ DEG AZ STEERING				8		
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CONTROL: 2-7 -0934 (36) CONTROL: E-7 -0934 (36) CONTROL: BEARING STAKE CENTER PREQ: 150 HZ 1 ELEMENT				A 8 Prime .		

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SECRE INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2-7-77 - 0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0954 (77)

OMNI SPECTRUM(ELEMENT 22)

EXERCISE: BEARING STAKE

CENTER FREQ: (50 HZ) SECRET INDEX 3575 SECRET CENTER PREQ: 150 SECRET

ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER REEL: FIY 33 DATE/TIME: 2-7-77 - 2134 Z
ANALYSIS BANDWIDTH: 1/10HZ
- DEG AZ STEERING DATE OF ANALYSIS: 10 7 & ES 등류 CONTROL: 2-7 -0934 (39)
OMNI SPECTRUM (BLEMENT 20)
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ Z. SECRET

INDEXJS75

SECRE ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2-7-72 -0937 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING CONTROL: 2-7 - C874 (46)
OHNI SPECTRUM (ELEMENT 2EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
I ELEMENT SECRET

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DATE OF ANALYSIS:

INDEX 25 25

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CONTROL: 2.7 -0934 (41)
OMNI SPECTRUM (ELEMENT 31 EXERCISE: BEARING STAKE CENTER FREQ: 150 HZ

DATE OF ANALYSIS:

REEL: F14

INDEXSSS

DATE/TIME: 2.7.77 - 2879 Z ANALYSIS BANDWIDTH: 1/10HZ DEC AZ STEERING

ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER

SECRET

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CONTROL: 2-7 -0834 (42)
OMNI SPECTRUM(ELEMENT 33) EXERCISE: BEARING STAKE CENTER FREQ: 150 HZ

DATE OF ANALYSIS:

INDEXSSSS

ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER

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ANALYSIS BANDWIDTH: 1/10HZ
- DEG AZ STEERING DATE OF AMALYSIS: CONTROL: 2-7 -0934 (43)
OMNI SPECTRUM(ELEMENT 35)
EXERCISE: BEAAING STAKE
CENTER PREÇ: 150 HZ
1 ELEMENT SECRET 33

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REEL:	TIME 320 SECS FILTER	
	INTEGRATION	
DATE OF ANALYSIS:	DATE/TIME: 2-7-27 - 0934 Z ANALYSIS BANDWIDTH: 1/10HZ	
PECTRUP	EXERCISE: BEARING STAKE CENTER FREQ: 150 H2 1 ELEMENT	SECRET

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SECRET INTEGRATION TIME 320 SECS DATE/TIME: 2-7-72 - 043f 2
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING DATE OF ANALYSIS: CONTROL: 2.7 - 0434 (47)
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ
1 ELEMENT SECRET

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SECRET INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2.7-77 -0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING CONTROL: 2-7 -0934 (44)
OMNI SPETTRUM (ELEMENT 4EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
1 ELEMENT SECRET

DATE OF ANALYSIS:

ATTEN: DB WTG: HANNING SECRET INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2-7.77 - 09342
ANALYSIS BANDWIDTH: 1/10H2
DEG AZ STEERING DATE OF ANALYSIS: EXERCISE: BEARING STAKE CENTER FREQ: 150 HZ 1 ELEMENT SECRET

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SECRE ATTEN: - DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2.7-17 - 0934 Z
AKALYSIS BANDWIDTH: 1/10HZ
DEG AZ STZERING DATE OF ANALYSIS: CONTROL: 2-7 -0424 (S1)
OMNI SPECTRUM(ELEMENT S1 EXERCISE: BEARING STAKE CENTER PRED: '50 HZ SECRET

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SECRET INTEGRATION TIME 320 SECS DATE/TIME: 2.7.77 - 0874 7 ANALYSIS BANDWIDTH: 1/10H2 DATE OF ANALYSIS: EXERCISE: BEARING STAXE CENTER FREQ: 150 HZ OMMI SPECTRUM (BLEMENT SECRET

INDEXSSSS ATTEN: DB WTG: HANNING SECRET INTEGRATION TIME 320 SECS PILTER REEL: F14 DATE/TIME: 2-7-77 - 0434 2 ANALYSIS BANDWIDTH: 1/10HZ DEG AZ STEERING DATE OF ANALYSIS: Manufacture of the Partition and Man EXERCISE: BEARING STAKE CONTROL: 2-7 - 0134 (1)
OMNI SPECTRUM (ELEMENT 210 CENTER PREQ: 1 ELEMENT CONTROL: 2-7 SECRET

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SECRET WIG: HANNING ATTEN: INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10H2 DATE/TIME: 2.7.77 - 0934 2 EXERCISE: BEARING STAKE CENTEP FREQ: 290 HZ SECRET

DATE OF ANALYSIS:

CONTROL: 2-7 -0124 (2 OHNI SPECTRUM(ELEMENT

INTEGRATION TIME 320 SECS DATE/TIME: 27-77 - 04242
ANALYSIS BANDWIDTH: 1/10HZ
- DEG AZ STEERING CONTROL: 2-7 -0434(3)
OHNI SPECTRUM(BLEMENT 2
EXERCISE: BEARING STAKE
CENTER FREQ: 260 HZ
I ELEMENT SECRET

ATTEN: _ DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2-7-77 - 04342 ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: EXERCISE: BEARING STAKE CENTER PREQ: 250 HZ CONTROL: 2-7 -0474 (4) SECRET

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ATTEN: - DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2-7-77 - 0434 2

ANALYSIS BANDWIDTH: 1/10HZ

- DEG AZ STEERING DATE OF ANALYSIS: CONTROL: 0534 - 61 (PP3)
OMNI SPECTRUM(ELEMENT 12)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ
I ELEMENT SECRET

ATTEN: _ DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2-7-77 - 0434 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING CONTROL: 2-7 -0934 (7)
OMNI SPECTRUM(ELEMENT 14 SECRET

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INDEX 3575 ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER REEL: F14 DATE OF ANALYSIS: ~ 548 548 TO T ~¥ CONTROL: 2-7 -0434 (9)
OMNI SPECTRUM (ELEMENT 19)
EXERCISE: BEARING STAKE
CENTER PREQ: 280 HZ
1 ELEMENT 18)

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ANALYSIS BANDWIDTH: 1/10HZ
- DEG AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0934 (11)

OMNI SPECTRUM(ELEMENT 2)

EXERCISE: BEARING STAKE

CENTER PREQ: 280 HZ

I ELEMENT SECRET

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ANALYSIS BANDWIDTH: 1/10HZ
— DEG AZ STEERING CONTROL: 2-7 -0914 (122)
OMNI SPECTRUM (ELEMENT 24)
EXERCISE: BEARING STAKE
CENTER PREQ: 280 HZ
1 ELEMENT SECRET

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OMNI SPECTROM (ELEMENT 31 EXERCISE: BEARING STAKE CENTER PREQ: 280 H2 I ELEFENT	DATE/TIME: 2-7-77 -6934 Z ANALYSIS BANDWIDTH:1/10HZ DEG AZ STEERING	INTEGRATION TIME 320 SECS PILTER	ATTEN: DB WTG: HANNING
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DATE OF ANALYSIS:	DATE/TIME: 2-7-77 - 0934 2	ANALYSIS BANDWIDTH: 1/10HZ	- DEG AZ STEERING
CONTROL: 2-7 -0014 (14) CMNI SPECTRUM (BLEMENT 33)	EXERCISE: BEARING STAKE	CENTER PREQ: 280 HZ	1 ELEMENT

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SECRE INTECRATION TIME 320 SECS PILTER DATE/TIME: 2-7-77 -0934 Z
ANALYSIS BANDWIDTH:1/10HZ
— DEG AZ STEERING CONTROL: 2-7 -0934 (18)
OMNI SPECTRUM(ELEMENT 37)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ SECRET

ATTEN: DB WTG: HANNING INDEXSSTS INTEGRATION TIME 320 SECS PILTER DATE OF ANALYSIS: CONTROL: 2-7 -0934 (19)
OMNI SPECTRUM(ELEMENT 29 EXERCISE: BEARING STAKE CENTER FREQ: 280 HZ SECRET

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ATTEN: DB WTG: HANNING INDEXSESS INTEGRATION TIME 320 SECS FILTER REEL: F14 DATE OF ANALYSIS: CONTROL: 2-7 -0434 (20)
OMNI SPECTRUM (ELEMENT 4)
EXERCISE: BEARING STAKE
CENTER PREQ: 280 HZ

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ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2.7-77 -0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
DEG AZ STEERING CONTROL: 27 -0474 (31)
OMNI SPECTRUM(ELEMENT 43)
EXERCISE: BEARING STAKE
CENTER FREQ: 280 H2 SECRET

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DATE OF ANALYSIS:

ATTEN: DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2-7-77 -0434 Z
ANALYSIS BANDWINTH: 1/10HZ
DEG AZ STEERING DATE OF ANALYSIS: CONTROL: 2.7 -0434 (22)
OMNI SPECTRUM(ELEMENT 45
EXERCISE: BEARING STAKE
CENTER FREQ: 280 HZ SECRET

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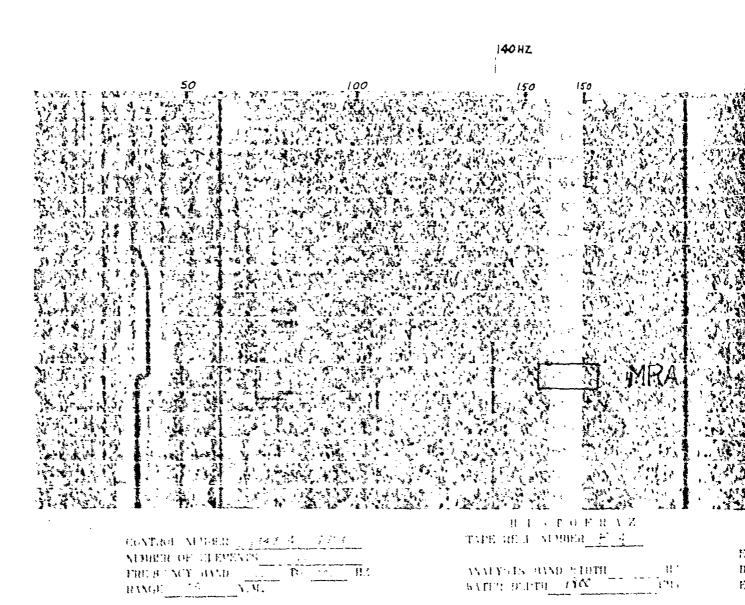
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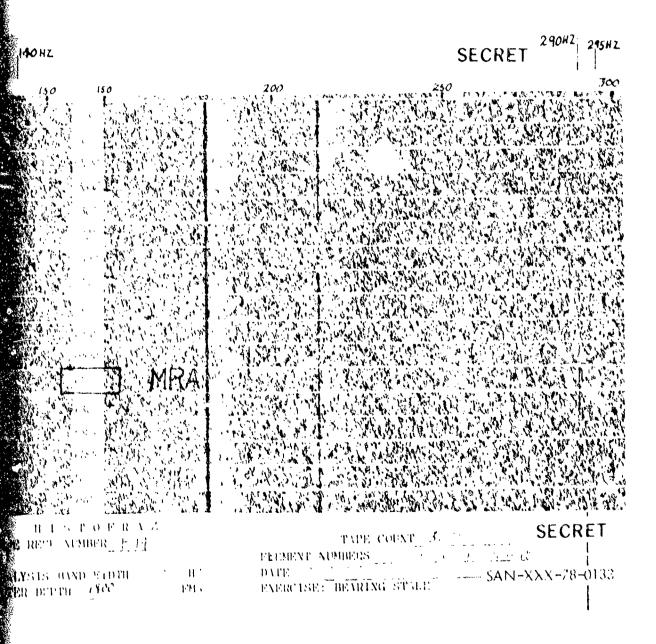
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INDEX 3575 ATTEN: - DB WTG: HANNING INTEGRATION TIME 320 SECS REEL: FIY DATE/TIME: 2-7-77 -09342
ANALYSIS BANDWIDTH: 1/10HZ
- DEC AZ STEERING DATE OF ANALYSIS: CONTROL: 2/7 -0934 (36)
OMNI SPECTRUM(ELEMENT 53)
EXERCISE: BEARING STAKE
CENTER PREQ: 280 HZ SECRET



WALLS AND FIRTH BY



CONFIDENTIAL

SIGNAL LEVEL AND SAR

CALCULATIONS

DATA POINT 3

FREQUENCY /40 AC NUMBER OF ELEMENTS /6

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -36.2

MCPS-32 CAL. CORRECTION

+10 -26.2

BEAMFORMER GAIN

MRA CORRECTION

418 - 8.2 SIG. LEVEL FOR SNR CALCULATION

+ .2 - 8.0 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL TABLE VEED -69.8

MCDS-32 CAL. CORRECTION +10 -49.8

BEIMFORMER GAIN

418 -31.8 NOISH LEVEL FOR AND CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

SIGNAL LEVEL FOR SSR

PROCESSOR CORRECTION

MRA CORRECTION

+ .2 19.4 SNR 1/10 HZ BAND

BANDWIDTH CONVERSION

-8-2 11.2 SAR 1 HZ BAND

THIS PAGE IS BEST QUALITY PRACTICABLE FROM COPY PARALLIED TO DDC

CONFIGENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 3 FREQUENCY 290 HZ NUMBER OF ELEMENTS 16

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED

MCPS-32 CAL. CORRECTION

+16 -33.5

BEAMFORMER GAIN

+18 -15.5 SIG. LEVEL FOR SAR CALCULATION

MRA CORRECTION

+.8 -14.7 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 CAL, CORRECTION +10 -56.8

BEAMFORMER GAIN

+18 -38.8 NOIST LEVEL FOR SHE CALCULATION

SIGNAL-NOTSE-RATIO

SIGNAL LEVEL FOR SAR

SIGNAL LEVEL FOR SNR

PROCESSOR CORRECTION

MRA CURRECTION

BANDWIDTH CONVERSION

-15.5 -38.8 23.3 -4.0 19.3 4.8 20.1 SUR 110 HZ BAND -8.2 11.9 SNA 1 HZ BAND

DATA POINT 3

SIGNAL GAIN

	140 HZ	290HZ	295HZ
MEAN ONNI SIGNAL LEVEL	-32.5	-38.6	
MRA SIGNAL LEVEL	- B.O	-14.7	
ARRAY SIGNAL GAIN	24.5	23.9	
20 LOG	24	24	
# of elements			
DIFFERENCE	+ .5	1	

ARRAY GAIN

MRA SNR	19.8	20.0	
MEAN OMNI SNR	9.0	5.8	
ARRAY GAIN	10.8	14.2	
THEORETICAL AZMUTH GAIN	10	12.3	
(at MRA) DIFFERENCE	+ ,8	+1.9	

33

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INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2-7-77 - 0434 Z
ANALYSIS BANDWIDTH: 1/10HZ
+20 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 - 0834 (16)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
16 ELEMENTS

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ATTEN: -/8 DB WTG: HANNING

INDE XJS75

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ATTEN: -/ DB WTG: HANNING INDE X3575 INTEGRATION TIME 320 SECS FILTER REEL: F14 DATE/TIME: 2-7-77 - 0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
22 DEC. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0\$?4 (16)
BRAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ SECRET

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ATTEN: -/ DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER REEL: F14 33 4 DATE/TIME: 2-7-77 - 0434 2
ANALYSIS BANDWIDTH: 1/10H2
+24 DEG. AZ STEERING DATE OF ANALYSIS: 70 7 CONTROL: 2-7 - 0934 (16)
BEAMFORMED SPECTRUM (ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ ¥¥ €#4 . (e. i., SECRET

INDE X3575

INDE XXX 25 ATTEN: -/Ø DB WTG: HANNING INTEGRATION TIME 320 SECS DATE/TIME: 2-7-77 - 0434 Z
ANALYSIS BANDWIDTH: 1/10HZ
+26 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0274 (14)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ

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ATTEN: 7 0 DB WTG: HANNING INDE XZS75 INTEGRATION TIME 320 SECS FILTER CONTROL: 2-7 - 0934 (14)
BEAMPORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 150 HZ SECRET

ATTEN: 1 DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2.7-77 - 0934 2
ANALYSIS BANDHIDTH: 1/10HZ DATE OF ANALYSIS: CONTROL: 2-7 - 0919 (/6)
BEAMFORMED SPECTRUM(ELEMENTS
EXPRCISE: BEARING STAKE
CENTER FREQ: 150 HZ SECRET

INDE XJC-25 ATTEN: -/Ø DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER 1 DATE/TIME: 2.7-77 - 0934 Z ANALYSIS BANDWIDTH: 1/10HZ DEG. AZ STEERING DATE OF ANALYSIS: 734 CONTROL: 2-7 -09'4 (16)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ

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ATTEN:-/ DB WTG: HANNING INDE XXXX INTEGRATION TIME 320 SECS FILTER 33 DATE/TIME: 2.7-22 - 0939 Z
ANALYSIS BANDWIDTH: 1/10HZ
+38 DEG. AZ STEERING DATE OF ANALYSIS: 104 F24 CONTROL: 3-7 - 0939 (1/2) BEAMFORMED SPECTRUM(ELEMENTS 다 EXERCISE: BEARING STAKE CENTER FREQ: 160 HZ SECRE

ATTEN: -/ Ø DB WTG: HANNING INDE X3575 INTEGRATION TIME 320 SECS FILTER REEL: FIY DATE/TIME: 2-7-77 - 047Y Z
ANALYSIS BANDWIDTH: 1/10HZ
+/6 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2.7 -0134 (16)
BEAMF!)RMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
// ELEMENTS SECRET

63

ATTEN: -/8 DB WTG: HANNING INDE X3595 INTEGRATION TIME 320 SECS FILTER REEL: F14 DATE'TIME: 2.7-77 -093Y Z
ANALYSIS BANDWIDTH: 1/1CPZ
7/8 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2.7 -0934 (16)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 H2
16 ELEMENTS 100

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ATTEN: 1 DB INDE X3575 SECRET INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: CONTROL: 2-7 - 0034 (14)
BEAMPORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ SECRET

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INDE XXX75

REEL: F14

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DATE OF ANCLYSIS:

CONTROL: 2- - - 0924 (14)
BEAMPORHED SPECTRUM(ELEMENTS

ATTEN: -/ DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10HZ DATE/TIME: 2-7-72 EXURCISE: BEARING STAKE CENTER FREQ: 270 HZ SECRET

INTEGRATION TIME 320 SECS PILTER REEL: F14 33 4 DATE/TIME: 2.7-77 - 0934 2 AMALYSIS BANDWIDTH: 1/10HZ DEC. AZ STEEKING DATE OF ANALYSIS: /-/6 72¢ -2 CONTROL: 2-7 -0974 (16)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 270 H2
12 ELEMENTS ---

ATTEN:-// DB WIG: HANNING

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INTEGRATION TIME 320 SECS PILTER ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: BEAMPORMED SPECIRUM (ELEMENTS EXERCISE: BEARING STAKE CENTER PREQ: 220 HZ CONTROL:0937

SFORET SECRET

INTÉGRATION TIME 320 SECS FILTER REEL: FIV \mathfrak{T} * DATE/TIME: 2-7-77 - 0939 Z
ANALYSIS BANDWIDTH: 1/10HZ
+21 DEG. AZ STEERING OF AMALYSIS: ţ. DATE 10 Te CONTROL: 2-7 -0f34 (16)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
16 ELEMENTS 24 ... SECRET

ATTEN: -// DB WTG: HANNING

INDE X3575

ATTEN:-/# DB INDE X3575 INTEGRATION TIME 320 SECS FILTER CONTROL: 2-7 -0814 (1/2)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ SECRET

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INTEGRATION TIME 320 SECS FILTER REEL: ,C/Y DATE/TIME: 2.7-77 - 0934Z
ANALYSIS BAHDWIDTH: 1/10HZ
+73 DEG. AZ STEERING DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0424 (1/2)
BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ

INDE XJS 75

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CONTRCL: 2-7 -0234 (14)
BEAMPORMED SPECTRUM(ELCHENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
14 ELEMENTS

DATE/TIME: 2.7-75 - 0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
+38 DEG. AZ STRERING DATE OF AMALYSIS:

REEL: F34

INDE X352

ATTEN: 7 DB WTG: HANNING

IN. EGRATION TIME 320 SECS PILTER

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 3

FREQUENCY 140 HZ NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED -36.6 MCPS-32 CAL. CORRECTION

+10 -26.5

BEAMFORMER GAIN

+24 -2.5 SIG. LEVEL FOR SHR CALCULATION

MRA CORRECTION

+ 12 -2.4 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 SIGNAL LEVEL INDICATED MCPS-32 CAL. CORRECTION +10 -51.1 +24 -27.1 NOIST LEVEL FOR SUR CALCULATION BEAMFORMER GAIN

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SAR -27.1 24.5 -4.0 20.5 +.2 20.7 SNR 1 HZ BAND -8.2 12.5 SAR 1 HZ BAND SIGNAL LEVEL FOR SNR PROCESSOR CORRECTION MRA CORRECTION BANDWIDTH CONVERSION

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 3

FREQUENCY 290 HZ NUMBER OF ELEMENTS 32

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED

MCPS-32 CAL. CORRECTION

BEAMFORMER GAIN

-11.2 SIG. LEVEL FOR SNR CALCULATION

MRA CORRECTION

+ .0 -10.4 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 STONAY LEVEL INDICATED

-69.1

MCTS-32 CAL. CORRECTION ±10 -59.8

BEAMFORMER GAIN

+24 -35./ NOIST LEVEL FOR SMR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

SIGNAL LEVEL FOR SNR

<u>-75.1</u> 23.9

PROCESSOR CORRECTION

- 4.0 19.9

MRA CORRECTION

+ .8 20.7

BANDWIDTH CONVERSION

-8-2 12.5

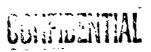
DATA POINT 3

SIGNAL GAIN

		140 HZ	290HZ	295112
MEAN ONNI	SIGNAL LEVEL	-32.5	-38.6	4.0.11111
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	SIGNAL GAIN	30.1	20.2	
20 LOG	32	30.1	30.1	
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ARRAY GAIN

MRA SNR	21.1	20.7	
MEAN OMNI SNR	9.0	5.8	
ARRAY GAIN	12.1	14.9	1
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DIFFERENCE	-1.0	3	-



ATTEN: -2% DB WTG: HANNING

INDE Y3575

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ATTEN: -24 DB WTG: HANNING INDE XJSZS INTEGRATION TIME 320 SECS REEL: F14 DATE/TIME: 2-7-77 - 09342
ANALYSIS BANDWIDTH: 1/10HZ
+20 DEC. AZ STEERING DATE OF ANALYSIS: CONTROL: 27 -0434 (32-)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ
37- ELEMENTS SECRET

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INDE XZZZZ ATTEN: -29 DB WTG: HANNING SECRET INTEGRATION TIME 320 SECS PILTER 33 ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: CONTROL: 27 -0034 (32-)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ
32- ELEMENTS L1 SECRET 1 € 2 € 2 ž ž LAI

ATTEN: -24 DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER DATE/TIME: 2.7-77 - 06:942
ANALYSIS BANDWIDTH: 1/10H2
+24 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0f34 (3-2)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 150 HZ
32 ELEMENTS SECRET

INDE X3575

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ATTEN: -> DB WTG: HANNING INDE X 3579 INTEGRATION TIME 320 SECS FILTER REEL: FIY . °33 DATE/TIME: 2-1-77 -0934 Z ANALYSIS BANDWIDTH: 1/10HZ 725 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0434 (32)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ
22 ELEMENTS 141

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CONTROL: 27 - 0934 (32-)
BEAMFORMED SPECTRUM(ELEMENTS 1-2-)
EXERCISE: BEARING STAKE DATE,
CENTER FREQ: 150 HZ
ANALY

DATE OF ANALYSIS:

1-26 d 29-34

DATE/TIME: 2-7-77 - 0934 2

ANALYSIS BANDWIDTH: 1/10HZ

+26 DEG. AZ STEERING

REEL: F/4

INTEGRATION TIME 320 SECS A FILTER WIG

INDE X362

SECS ATTEN: 24 DB LTER WTG: HANNING

INDE X3525 ATTEN: -2 4 DB WTG: HANNING	
REEL: F/4 INTEGRATION TIME 320 SECS FILTER	
DATE OF ANALYSIS: 1-36 ¢ 25-34 DATE/TIME: 27.77 ANALYSIS BANDWIDTH: 1/10HZ	
CONTROL: 2-7 - 2\$34 (32) BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER PREQ: 150 HZ 32 ELEMENTS	

INDE X3575 TEN:-2 y DB HANNING			S						
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REEL: TIME 320		1 1 1							
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DATE/TIME: 2-7-77 - 0934 2
ANALYSIS BANDWIDTH: 1/10HZ
+32 DEG. AZ STEERING DATE OF ANALYSIS: 15-30 \$ 20 -1 CONTROL: 2-7 - 0934 (F2)
BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER PREQ: 150 HZ

REEL: FIG

INDE X2225

ATTEN: ->Y DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER

SECRET 32

ATTEN: - 34 DB WTG: HANNING INDE X3575 INTEGRATION TIME 320 SECS FILTER REEL: F14 DATE/TIME: 2-7-77 - 0f242
ANALYSIS BANDWIDTH: 1/10H2
+34 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 27 -0434 (32)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE CENTER FREQ: 160 HZ

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INDE X2755 TTEN:-** DB:: HANNING	
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REEL TIME 320	
INTEGRATION	
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INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2.7-77 - 09342
ANALYSIS BANDWIDTH: 1/10HZ
+/C DEG. AZ STEERING DATE OF ANALYSIS: /- 26 4 28-34 DATE/TIME: 2-77-CONTROL: 2-7 -0934 (32)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

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ATTEN: -2% DB WTG: HANNING SECRET

INDE XXXX	ATTEN: 24 DB	
REEL: F/Y	INTEGRATION TIME 320 SECS	45177
DATE OF ANALYSIS:		ပ
CONTROL: 27 -0934 (32) BEAMPORMED SPECTRUM (ELEMENTS	EXERCISE: BEARING STAKE	: 🗀

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DATE OF ANALYSIS CONTROL: 2-7 -0934 (32-)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 220 HZ
32. ELEMENTS

DATE/TIME: 2-7-7 - 09342
ANALYSIS BANDWIDTH: 1/10HZ
+20 DEG. AZ STEERING

INDE XZCZS

ATTEN: -24 DB WTG: HANNING INTEGRATION TIME 320 SECS FILTER

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DATE/TIME: 2.7.77 - 043% Z ANALYSIS BANDWIDTH: 1/10HZ CONTROL: 2-7 -0934 (32) BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER PREQ: 270 HZ

INTEGRATION TIME 320 SECS PILTER

INDE X 3575

ATTEN: -34 DB WTG: HANNING

SECRET

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DATE/TIME: 2-7-72 - 0114 Z DATE OF ANALYSIS: CONTROL: 2-7 -0834 (32)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 270 HZ
32 ELEMENTS

INTEGRATION TIME 320 SECS FILTER WT

REEL: F/G

INDE X 2575

ECS ATTEN: 74 DI TER WTG: HANNING

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INDE X 3575 ATTEN: 24 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER REEL: FIY DATE/TIME: 2.7-77 - 0414 Z ANALYSIS BANDWIDTH: 1/10HZ DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 0414 - 5/ (b) 3)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 270 HZ
33. ELEMENTS

5. E.

INTEGRATION TIME 320 SECS PILTER REEL: FIY DATE/TIME: 2-7-77 - 0434 Z
ANALYSIS BANDWIDTH: 1/10HZ
+>6 DEG. AZ STEERING DEG. AZ STEERING NATE OF ANALYSIS: DATE CCNTROL: 2-7 -0434 (32-)
BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING SIAKE CENTER FREQ: 270 HZ

ATTEN: -> Y DB WTG: HANNING INDE X 35 75'

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CONTROL: 2-7 -0934 (32-)
BEAMFORM A SPECTRUM (ELEMENTS
EXERCISE BEARING STAKE
CENTER FREQ: 270 HZ
32 ELEMENTS

REEL: F14

INDE XXXXX

ATTEN:-27 DB WTG: HANNING INTEGRATION TIME 320 SECS

3

DATE/TIME: 2.7-77 - 0474 Z
ANALYSIS BANDWIDTH: 1/10HZ
+38 DEG. AZ STRERING OF ANALYSIS: 1-26+28-34 CONTROL: 2-7 -0474 (72-)
BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 270 HZ
32 ELEMENTS

INTEGRATION TIME 320 SECS ATTEN: ->Y DB FILTER WTG: HANNING

INDE X3575

REEL: F/4

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INDE X3575 ATTEN:->Y DB WTG: HANNING			RET		
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CONTROL: 2-7 -0934 (22.) BEAMPORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE D CENTER PREQ: 270 HZ 72 ELEMENTS	* * * * * * * * * * * * * * * * * * *				
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ATTEN: -24 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2-7-7-0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
+3 > DEG. AZ STEERING DATE OF ANALYSIS: 1 20-1 CONTROL: 2-7 -0124 (3-2)
BPAMFORMED SPECTRUM(ELEMENTS
ZXERCISE: BEARING STAKE
CENTER PREQ: 270 HZ
32- ELEMENTS SECRET

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INDE X3575 ATTEN: ->V DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2-7-77 - 0434 Z
ANALYSIS BANDWIDTH: 1/10HZ
+34 DEG. AZ STEERING CONTROL: 2-7 -0474 (2.)
BRAMFORMED SPECTRUM(ELEMENTS
E ERCISE: BEARING STAKE
CENTER PREQ: 270 HZ
32. ELEMENTS SECRET

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ATTEN: -24 DB WTG: HANNING INDE X3575 INTEGRATION TIME 320 SECS PILTER REEL: F/4 ANALYSIS BANDWIDTH: 1/10HZ OF ANALYSIS: DATE/TIME: 2-7-77 51-60 p 30-1 DATE CONTROL: 2-7 - 0474 (3 >)
BEAMPORHED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE
CENTER FREQ: 270 HZ
32- BLEMENTS

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SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 3

FREQUENCY 140 HZ NUMBER OF ELEMENTS 5/

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED __375

MCPS-32 CAL. CORRECTION +10 -27.5

BEAMFORMER GAIN

MRA CORRECTION

+ 2.5 SIG. LEVEL FOR SNR CALCULATION

+ .2 + 2.7 SIG. LEVEL FOR SIGNAL GAIN

NOISE LEVEL

MCPS-32 CAL. CORRECTION +10 -55.8
BEAMFORMER GAIN

+30 -25.8 NOISE LEVEL FOR SMR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SNR

SIGNAL LEVEL FOR SNR PROCESSOR CORRECTION

MRA CORRECTION

-25.8 28.3 -4.0 24.3 + .2 24.5 SNR 40 Hz BRUS

BANDWIDTH CONVERSION

16.3 SHA 1 HZ BAND

CONFIDENTIAL

SIGNAL LEVEL AND SNR

CALCULATIONS

DATA POINT 3

FREQUENCY 290 HZ NUMBER OF ELEMENTS 5/

SIGNAL LEVEL

MCPS-32 SIGNAL LEVEL INDICATED

MCPS-32 CAL. CORRECTION +10 -37.4

BEAMFORMER GAIN

+30 -7.4 STG. LEVEL FOR SHR CALCULATION
+ .8 -6.6 STG. LEVEL FOR SIGNAL GAIN

MRA CORRECTION

NOTSE LEVEL

MCPS-32 CAL. CORRECTION ±10 -67.2

BEAMFORMER GAIN

+30 -33.2 NOIST LEVEL FOR SMR CALCULATION

SIGNAL-NOISE-RATIO

SIGNAL LEVEL FOR SMR

SIGNAL LEVEL FOR SNR

PROCESSOR CORRECTION

MRA CURRECTION

BANDWIDTH CONVERSION

-4.0 21.8 + .8 22.6 SAR 1/10 HZ BAND -8.2 14.4 SAR 1 HZ BAND

CONFIDENTIAL

DATA POINT 3

SIGNAL GAIN

	140 HZ	290HZ	295HZ
MEAN OMNI SIGNAL LE	VEL -32.5	- 38.6	
MRA SIGNAL LEVEL	+ 3.7	- 6.5	
ARRAY SIGNAL GAT	IN 35.2	32.1	
20 LOG	34.1	34-1	
# of elements	5		
DIFFERRANCE	+ 1.1	- 2.0	

ARRAY GAIN

MRA SNR	24.5	22.6	
MEAN OMNI SNR	9.0	8.85.6	
ARILAY GAIN	15.5	10.8 70	
THEORETICAL AZMUTH GAIN (at MRA)	15.1	17.2	
DIFFERENCE	+ • 4	4	

CONFIDENTIAL

INDE X 3575 ATTEN: -3 * DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER REEL: FIY DATE/TIME: 2-7-72 -0434 Z
ANALYSIS BANDWIDTH: 1/10HZ
+24- DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0(SY (6/)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 HZ
51 ELEMENTS

315-11

TIME 320 SECS ATTEN:-70 DB FILTER WTG: HANNING	
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INDE X 3525 ATTEN: 30 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2.7.77 - 0414 Z
ANALYSIS BANDWIDTH: 1/10H2
+ 25 DEC. AZ STEERING DATE OF ANALYSIS: CONTROL: 0934 - 51 (NF3)
BEAMFORNED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FRRQ: 150 HZ
51 ELEMENTS SECRET INDE X3575 ATTEN: -30 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER AREL: F14 ANALYSIS BANDWIDTH: 1/10HZ DATE OF ANALYSIS: CONTROL: 2-7 -0624 (51)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEAKING STAKE CENTER FREQ: 150 HZ

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CONTROL: 23 -0839 (F.L.)	BEAMPORMED SPECTRUM (ELEMENTS	ERCISE: BEARING	CENTER FREQ: 150 HZ	

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INDE X 3575 ATTEN: -30 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER REEL: F14 DATE/TIME: 2-7-77 - 09342
ANALYSIS BANDWIDTH: 1/10H2
+39 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0934 (61)
BEAMFORMED SPECTRUM(ZL"MENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 150 H2
51 ELEMENTS SECRET

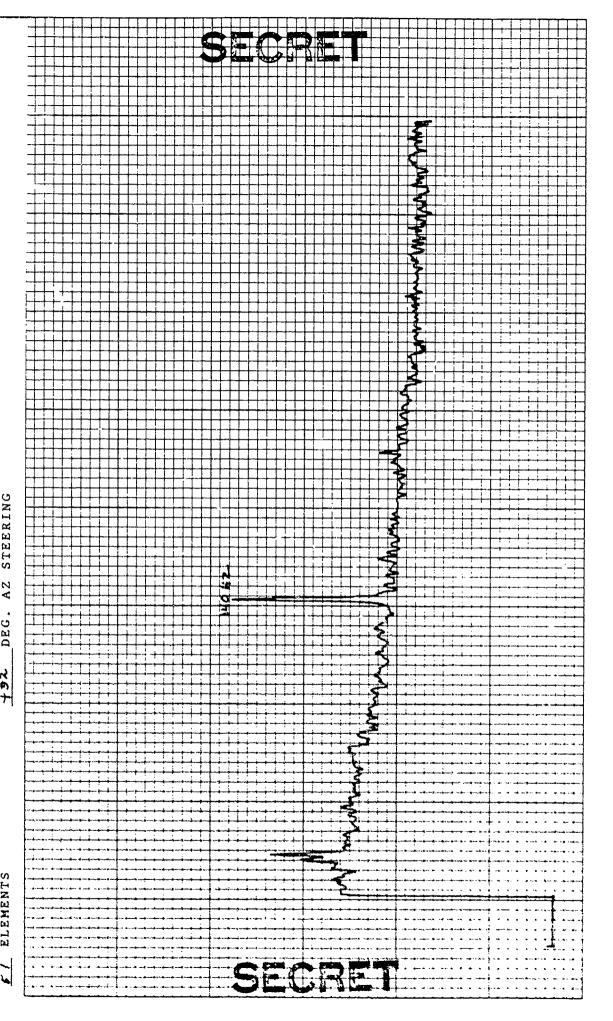
INDE XXXX

ATTEN:-2 DB WTG: HANNING

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DATE/TIME: 2-7-77 -0934 Z
ANALYSIS BANDWIDTH: 1/10HZ
+32 DEG. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 - 0434 (5/)
BEAMFORMED SPECTRUM(ELEMENTS EXERCISE: BEARING STAKE CENTER FREQ: 160 HZ

ATTEN:-30 DB WTG: HANNING INDE X.35.75 INTEGRATION TIME 320 SECS FILTER



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CONTROL: 2-7 BEAMFORMED EXERCISE: BI CENTER FRE	
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INDE X3575 ATTEN: -30 DB WTG: HANNING INTEGRATION TIME 320 SECS PILTER REEL: FIY ANALYSIS BANDWIDTH: 1/10HZ ATE OF ANALYSIS: DATE/TIME: 3-7-77 CONTROL: 2-7 -0974 (51)
BEAMPORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER PREQ: 270 HZ
51 ELEMENTS SECRET

ATTEN:-30 DB WIG: HANNING INDE XXXX INTEGRATION TIME 320 SECS PILTER DATE/TIME: 2-7-72 - 0434 Z
ANALYSIS BANDWIDTH: 1/10HZ
4-35 DEC. AZ STEERING DATE OF ANALYSIS: CONTROL: 2-7 -0034 (51)
BEAMFORMED SPECTRUM(ELEMENTS
EXERCISE: BEARING STAKE
CENTER FREQ: 220 HZ
5) ELEMENTS 24 2

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0934 - RED SPE : BEAK REQ: 2		المعافستين وسوسوه والأهابون	Service of Charles and Charles		-	<b>.</b>
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## **DEPARTMENT OF THE NAVY**

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IN REPLY REFER TO:

5510/1 Ser 321OA/011/06 31 Jan 06

## MEMORANDUM FOR DISTRIBUTION LIST

Subj: DECLASSIFICATION OF LONG RANGE ACOUSTIC PROPAGATION PROJECT (LRAPP) DOCUMENTS

Ref: (a) SECNAVINST 5510.36

Encl: (1) List of DECLASSIFIED LRAPP Documents

- 1. In accordance with reference (a), a declassification review has been conducted on a number of classified LRAPP documents.
- 2. The LRAPP documents listed in enclosure (1) have been downgraded to UNCLASSIFIED and have been approved for public release. These documents should be remarked as follows:

Classification changed to UNCLASSIFIED by authority of the Chief of Naval Operations (N772) letter N772A/6U875630, 20 January 2006.

DISTRIBUTION STATEMENT A: Approved for Public Release; Distribution is unlimited.

3. Questions may be directed to the undersigned on (703) 696-4619, DSN 426-4619.

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# **Declassified LRAPP Documents**

,			Publication Source	Puh	Current	
Keport Number	Personal Author	Title	(Originator)	Date	Availability	Class.
Unavailable	Bossard, David C.	ACOUSTIC ANALYSIS/ASEPS	Wagner Associates	780726	ADA076268	D
NRLMR3832	Heitmeyer, R., et al.	PRELIMINARY RESULTS OF AN ANALYSIS OF BEAM NOISE IN THE MEDITERRANEAN (U)	Naval Research Laboratory	780901	AC NP 22	n
Unavailable	Watrous, B. A.	OMPENDIUM	Naval Ocean R&D Activity	781101	ADB115967	n
Unavailable	Dunbar, B., et al.	LAMBDA PROCESSING LABORATORY AND ENGINEERING SUPPORT, FINAL REPORT 1 JANUARY 1977 - 31 OCTOBER 1978	Texas Instruments, Inc.	781129	ND	n
Unavailable	Blumen, L. S., et al.	ASTRAL MODEL. VOLUME 2: SOFTWARE IMPLEMENTATION	Science Applications, Inc.	790101	ADA956122	Ŋ
Unavailable	Spofford, C. W.	ASTRAL MODEL. VOLUME 1: TECHNICAL DESCRIPTION	Science Applications, Inc.	790101	ADA956124	n
Unavailable	Townsend, R., et al.	SELF-TENSIONING ACOUSTICAL HORIZONTAL LINE ARRAY (SPRAY) DATA ANALYSIS. FINAL REPORT OF BEARING STAKE TESTS JANUARY THRU MARCH 1977. VOLUME IA. OVERALL PROGRAM PERFORMANCE RESULTS WITH TEST RESULTS SUMMARY	Sanders Associates, Inc.	790101	ADC017573	n
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